Innovation, work Organisation and Systems of Social Protection

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1. Introduction

Much of the core research on the determinants of innovation traditionally has focused on the role of formal processes of R&D and on the importance of the skills and expertise of scientists and engineers with third-level education. In research on national innovation systems there has been a parallel tendency to focus on the institutions and organisations responsible for the production and diffusion of formal scientific and technical knowledge. At the level of measurement these emphases are reflected in the classic definition of innovation presented in the 1996 edition of the Oslo Manual as technical product and process innovation (TPP), and at the level of innovation policies they can be seen in the priority regularly given to increasing national R&D intensity. More recently there have been notable efforts to widen the scope of innovation research so as to more fully take into account the role of work processes, systems of labour market protection and more generally the impact of welfare state institutions. This chapter focuses on these changes in scope and seeks to identify key challenges for researchers in innovation studies.

The chapter begins by examining how work organisation has been analysed in the developing field of innovation studies including the factors that account for the growing interest in the 2000s in measuring and analysing processes of organisational innovation. It is argued that a key challenge still facing researchers in innovation studies is developing an adequate understanding of the interdependencies between work organisation and processes of technical change and innovation. The chapter then turns to the analysis of national systems, arguing that there is a need for developing more robust typologies of innovation systems that integrate the role of labour markets and welfare state institutions. A related challenge is developing multi-level governance frameworks that serve to clarify the interconnections between these social

[1] Chapter prepared for Andersen, Fagerberg and Martin (eds.), forthcoming, *The Future of Innovation Studies*, Oxford, Oxford University Press.

institutions at the levels of nations and regions. The chapter concludes by discussing the obstacles to putting work organisation and organisational innovation more firmly on the EU policy agenda.

2. Work organisation and organisational design

The analysis of work organisation and organisational design was addressed in some of the early contributions to innovation studies and notably in Freeman's (1987) classic study of the Japanese innovation system.[2] Freeman focused on the characteristics of the Japanese firm as an innovative organisation arguing that the factory was used as a laboratory for innovation and that the success of innovations and their rate of diffusion were strongly related to different forms of work organisation. In his 1995 paper on globalisation and innovation systems, Freeman emphasised the importance of the interdependencies between technical and organisational innovations in the diffusion of radical innovations, arguing that, "a theory of technical change which ignores these interdependencies is no more helpful than a theory of economics which ignores the interdependencies of prices and quantities in the world economy" (Freeman, 1995, p. 18). Subsequently, as Lundvall has observed (p. xx this volume), innovation studies scholars have given relatively little attention to the role of workers and work organisation in innovation processes and the emphasis has rather been on the role of formal R&D and on the skills and expertise of engineers, scientists and managers. In this light, it is relevant that Fagerberg and Verspagen (2009) in their use of citations in *Research Policy* to identify the core literature in innovations studies recognise only two publications focusing on the organisation of the firm, the classic studies by Cohen and Levinthal (1989, 1990) on absorptive capacity. Interestingly, none of the literature specifically focusing on routines or dynamic capabilities finds its way into the core list. More generally, the management strategy literature dealing with the relation between organisation design and enterprise performance is absent. A first conclusion is that the analysis of work organisation and organisational design has been rather marginal to the development of the field of innovation studies.

The 2000's, though, have seen a growing interest in the organisational dimension of innovation processes, notably at the level of measurement. A major impetus to this has been the recognition that existing measures poorly capture innovation processes in services, which

[2] Also see Freeman and Soete (1987).

are typically less technological and R&D intensive compared to manufacturing innovation and are often relational in character, having to do with changes in the organisation of relations between service providers and users (Miles, 2008; Tether, 2003; Tidd, 2003). Acknowledging these differences, the 2005 version of the Oslo Manual abandoned the established definition of technological product and process (TPP) innovation and developed expanded definitions of innovation covering not only product and process innovation but also organisational and marketing innovation. Organisational innovation is defined broadly to include the implementation of a new organisational method in the firm's business practices, workplace organisation or external relations (Oslo Manual, 2005, p. 50). The use of these new definitions in the design of successive waves of the Community Innovation Survey (CIS) after 2005 means that researchers now have access to data measuring for the EU-27 the frequency and the amount of expenditure not only on product and process innovations but also on organisational and marketing innovations.

While these new measures have been useful for estimating the frequency of and correlations between different types of innovations across manufacturing and service sectors (e.g. Schmidt and Rammer, 2007), it is far clear that they have contributed to progressing Freeman's (1995, p. 18) agenda of developing a better conceptual understanding of the interdependencies between organisational change on the one hand, and product and process innovation on the other. In my view, this can be explained in part by the measurement framework adopted for organisational innovation in the 2005 version of the Oslo Manual which lends itself to the idea that workplace organisation is a separate 'social' or 'non-technological' dimension' that can be analysed independently from the 'technological dimension' of innovation processes. This bracketing and separation of the organisational dimension is reflected in the separate indicators of 'technological' and 'non technological' innovation that can be downloaded from Eurostat's electronic data base, where the former refers to core product and process innovations and the latter to organisational and marketing innovations.[3] While the widening of the scope of the definition and measurement of innovation promoted by the OECD and the European Commission is clearly to be welcomed, the tendency to classify product and process innovation as technological and organisational innovation as non-technological gives the mistaken impression that the former can be understood independently of organisational arrangements and are somehow non-social.

[3] For measures of technological and non-technological innovation for the EU-27 based on CIS-2008, see http://appsso.eurostat.ec.europa.eu/nui/setupModifyTableLayout.do

There are of course limitations to what one can measure with a single survey instrument and CIS indicators of organisational and marketing innovation were essentially add-ons to a survey framework that was designed to measure the frequency and amount of expenditure on product and process innovations. Still, it isn't clear what researchers and policymakers are supposed to make of the very broad measures the CIS provides of how much organisational change or innovation has taken over a three-year period within private sector enterprises. Organisational innovations are defined to include changes in managerial systems, changes in work organisation and changes in the structure of relations with other organisations. From both the research and policy angle obvious questions are: Changes in what direction? And what are the rates of adoption of specific types of managerial practices and forms of work organisation that correspond to particular organisational designs? The conceptual and measurement shift that I am arguing for is much in keeping with Freeman's (1995) argument about the importance of analysing the interdependencies between organisational change and technical innovation. Rather than focusing on organisational innovation as a separate type of innovation, the organisational dimension should be treated as a context within which employees learning and knowledge creation takes place. A key question then is what kinds of organisational designs and forms of work organisation promote product and process innovation, and the policy challenge is how to promote the adoption of these good designs and forms. Getting information relevant to these questions and policy agendas would require a different specialised survey.

At the national level there are enterprise-level surveys that provide this sort of information on organisations. For the most part they have been developed and administered by researchers outside of the innovation studies community and in general they don't provide the information that would allow researchers to explore the relations between organisation and innovation.[4] A notable exception is the DISKO survey designed and administered at Aalborg University where there has been a unique collaboration between researchers in innovation studies, human resource management and industrial relations. A clear impetus in the design of the survey was the interest of Lundvall and his colleagues at Aalborg in developing measures of 'learning organisations' as central components of the learning economy. Thus the DISKO survey questionnaire includes not only indicators of product and process innovation, but also

[4] For a comprehensive overview of organisational surveys undertaken in Europe and North America, see 'GRID Report', EU Meadow project background document No. 2: http://www.meadow-project.eu/images/docmeadow/back_gridreport.pdf

indicators of the use of a variety of managerial practices and forms of work organisation that can be used to capture styles and rates of employee learning. This provides the basis for a statistical analysis of the interrelations between organisational forms and styles of employee learning on the one hand, and the frequency of product and process innovation on the other. A number of publications based on DISKO have identified positive correlations between the frequency of product and process innovation and the use of 'high-involvement' work practices such as autonomous teams, flexible demarcations in work tasks, and systems of employee involvement (Foss and Laursen, 2003; Nielsen and Lundvall 1999; Lundvall and Nielsen, 2007; Jensen, et al. 2007).

While these results and others based on other specialised national-level enterprise surveys support the view that work organisation and organisational practice are important determinants of innovative outcomes, they leave unexplored the wider issue of identifying and analysing the impact of inequalities in the distribution of the learning capabilities of individuals and organisations across regions and nations. In the absence of a harmonized EU-level enterprise survey providing relevant measures, the most ambitious attempts to map national differences in learning capabilities have been based on the results of successive waves the European Working Conditions Survey (EWCS) carried out at the employee-level (Lorenz and Valeyre, 2005; Holm, et al. 2007; Lorenz and Lundvall, 2010). The use of employee-level data to characterise work processes and organisation has advantages and disadvantages relative to enterprise-level data. While the employee's perspective is limited in terms of capturing the overall structure and strategy of the enterprise, it provides a much richer characterisation of daily work activity and how it relates to individual skills development and learning than can be provided by a questionnaire directed to an upper-level manager or employer.

Table 1 below, which draws on the results of the 3rd EWCS carried out in 2000, presents an index of inequalities in access to learning opportunities at the workplace for the EU-15 for employees working in private sector establishments with 10 or more employee. The index is based on the results of a cluster analysis performed on a set of indicators of work organisation that serves to identify the frequency of what is referred to as the as the 'discretionary learning' form of work organisation, characterised by high levels of learning, problem-solving and employee control over how work is carried out and over the pace of work.[5] The first column

[5] For a detailed description of the indicators used and the clustering technique, see Lorenz and Valeyre, 2005.

of figures in Table 1 gives the frequency of discretionary learning for all employees across the EU-15. Columns 2 and 3 show the percentages of 'managers' and 'workers' with access to discretionary learning and the fourth column uses these results to construct an inequality index. The index shows that access to learning at the workplace tends to be much more equal in the Nordic nations and in the Netherlands than it is in the southern European nations, while the position of most of the Continental European nations is intermediary. Interestingly, both the UK and Ireland figure amongst the group of nations that are most unequal in terms of employee access to learning at the workplace.

Table 1: Inequalities in Access to Learning, EU-15

	Share of all employees in discretionary learning	**Share of managers in discretionary learning**	**Share of workers in discretionary learning**	**Learning Inequality index***
		North		
Netherlands	64,0	81.6	51.1	37.3
Denmark	60,0	85.0	56.2	35.9
Sweden	52,6	76.4	38.2	50.3
Finland	47,8	62.0	38.5	37.9
		Centre		
Austria	47,5	74.1	44.6	39.9
Germany	44,3	65.4	36.8	43.8
Luxembourg	42,8	70.3	33.1	52.9
Belgium	38,9	65.7	30.8	53.1
France	38,0	66.5	25.4	61.9
		West		
UK	34,8	58.9	20.1	65.9
Ireland	24,0	46.7	16.4	64.9
		South		
Italy	30,0	63.7	20.8	67.3
Portugal	26,1	59.0	18.2	69.2
Spain	20,1	52.4	19.1	63.5
Greece	18,7	40.4	17.0	57.9

Source: 2nd European Working Conditions Survey, 2000, as presented in Lundvall, Rasmussen and Lorenz (2008).
* 'Managers' are defined to include managers, professionals and technicians, while 'workers' include clerks and sales staff and skilled and unskilled manual occupations. The inequality index is constructed by dividing the share of 'workers' engaged in discretionary learning by the share of 'managers' engaged in discretionary learning and subtracting the resulting percentage from 100. If the share of workers and managers were the same, the index would equal 0, and if the share of workers was 0 the index would equal 100.

By eyeing columns 2 and 3, it can be seen that the dispersion in access to learning across nations is lower for managers than it is for workers. This implies that the higher overall frequencies of discretionary learning in the Nordic nations have been achieved in part by deepening organisational learning in the sense of extending it down the organisational hierarchy to include manual operators and lower level sales and service personnel. This is

reflected in the fact that there is a strong and statistically significant negative correlation (-0.84) between the share for all employees and the inequality index.

Elsewhere we have shown that access to learning matters for the quality of working life and that those employees engaged in discretionary learning tend to be more satisfied with their jobs than those working in jobs with less discretion and scope for learning. (Lorenz, et al. 2004). But how much does it matter for innovation performance? Here we face the limitations of using employee-level data and the analysis can only be carried out at the aggregate level. In Arundel et al. (2007) using aggregate data from the 3rd CIS we showed that in nations where work is organised to support high levels of discretion in solving complex problems firms tend to be more active in terms of innovations developed, at least to some degree, through their creative in house efforts. In countries where learning and problem-solving on the job are more constrained, and little discretion is left to the employee, firms tend to be engaged in a supplier-dominated innovation strategy. Going beyond this macro-level of analysis to explore at a micro-level the relations between innovation performance on the one hand and organisational design and forms of work organisation on the other would require a new European survey carried out at the enterprise-level.[6]

3. National systems of innovation and competence building: what are the relevant institutions?

How can be we account for differences in access to learning at the level of national systems? As an eyeing of the percentages in column 1 of Table 1 suggests, while differences in the level of economic development may explain part of the variance - the degree of penetration of discretionary learning is relatively low in the less developed southern nations – the level of economic development cannot provide a complete explanation. There are wide differences in the frequency of discretionary learning between the Nordic nations, the UK and the Continental European nations, all at similar levels of economic development. This raises the question of intuitional embeddedness and the way national level institutions impact on firm-level outcomes. But what institutions should we focus on?

[6] Arguably the optimal solution would be a linked employer/employee survey that would provide complementary information from both the employer's and employee's perspective. For a proposed linked survey design for developing harmonised measures of organisational change and its economic and social impacts, see the EU MEADOW project: http://www.meadow-project.eu/

While I have emphasized that comparative research on work organisation and organisational design could benefit from better empirical measures, I would argue there is a need for better theory in innovation systems research as a basis for better typologies of national systems. In some of the earlier work on national innovations systems coming out of the US, there was tendency to focus on the R&D system understood in terms of the relations among the private and public organisations and institutions responsible for formal R&D (Nelson, 1993). This can be seen as paralleling a focus on formal R&D in micro-level studies of innovation to the neglect of the social or organisational dimension.

More recently, and paralleling efforts to widen the definition and measurement of innovation, there have been efforts to widen the institutional focus in innovation systems research to include a consideration of how the structure of labour markets and national systems of social protection impact on micro-level learning and innovation processes. Lundvall has been an important contributor to this research agenda and his distinctive approach is closely connected to a theoretical position concerning the changing nature of competitiveness summarised in the notion of the 'learning economy' (Lundvall and Johnson, 1994). Lundvall argues that advanced economies have moved into a phase where the most important factor in competitive performance is the capacity of individuals and organisations to learn and further he advances the view that social capital or trust form an essential underpinning of the learning economy. The importance attached to trust can already be seen in his early work on user-producer relations where he argues that shared norms and codes of behaviour support interactive learning (Lundvall, 1985, 1988). The idea is more fully articulated in his jointly edited volume on the 'globalising learning economy' (Archibugi and Lundvall, 2001) and in his book on innovation and social cohesion in the Danish model (Lundvall, 2002). He argues that inequalities in the distribution of learning capabilities between individuals and organisations may prove self-reinforcing and result in polarisation, notably at the level of labour markets within national systems. These tendencies towards polarisation may in turn undermine the very conditions for the learning economy's success by weakening trust and social cohesion within and across organisations. This in turn leads to an interest in looking at the way differences in national labour markets and systems of social protection impact on the distribution of the costs and benefits of change and consequently on differences in the dynamics of learning and innovation of national systems (Lorenz and Lundvall, 2006).[7]

[7] This analysis is also the basis for the idea that a 'New New Deal' is now needed to sustain the learning economy.

Other important contributions to this wider understanding of national systems have come from outside of the core of the innovation studies community, and in particular from researchers working on the 'varieties of capitalism' (VoC) (Hall and Soskice, 2000; Whitley, 1998) or on 'social systems of production' (Boyer and Hollingsworth, 1997). I think it is fair to say that innovation has never been the central focus in this latter research. The VoC literature, for example, has arguably been more centrally concerned with the way differences in vocational training systems and the mix of general and specific skills in a nation impact on social policy preferences for different types of social protection (Estevez-Abe et. al. 2000; Iversen and Soskice 2006). The VoC framework, however, generated novel hypotheses concerning the relation between innovation outcomes and national institutional configurations, with the argument that coordinated market economies (CMEs) such as Germany or Japan will tend to be relatively specialised in incremental innovation, while liberal market economies (LMEs) such as the US or the UK will tend to be relatively specialised in more radical innovations.

This hypothesis emerged from exploring the implications for innovation of a core notion developed in the VoC literature, namely that national systems will display comparative economic advantages corresponding to the nature of the complementarities among their institutions. Following Aoki (1994), institutional complementarities are defined to exist when the presence of one institution increases the efficiency or benefits from the presence of another. Further, although the selection mechanisms are merely hinted at, it is argued that a form of institutional coordination in one sphere of the economy (e.g. corporate governance) will tend to generate complementary forms in other spheres (e.g. labour markets or the organisation of work), implying that the configuration of institutional arrangements in a nation will not be random (Hall and Soskice, 2000, p. 18). Thus, extending the insights of Aoki (1986) in his comparative analysis of the Japanese and American firm, VoC theorists have argued that incremental innovation will be favoured in CMEs because of institutional complementarities between corporate governance arrangements that are relatively insensitive to short term profitability and hence favour long-term employment tenures, well developed systems of vocational training providing an appropriate mix of firm and industry-specific skills, and industrial relations systems characterised by works councils and consensus decision making.

LMEs, on the other hand, will have a comparative advantage in radical innovation. Well-developed equity markets with dispersed shareholders in LMEs will facilitate the acquisition of new technologies through mergers and acquisitions. These financial institutions will be highly complementary to relatively fluid labour markets making it easier for companies to rapidly reconfigure their knowledge bases in order to develop new product lines. Labour market mobility is promoted by a lack of restrictions on hiring and firing in LMEs combined with weak initial vocational training systems that encourage investments in general over firm-specific skills. Further, the hierarchical structure of companies in LMEs, with power concentrated at the top, will make it easier for senior management to implement new business strategies in comparison to management in CME enterprises who are constrained by the requirements of consensus decision-making (Hall and Soskice, 2001, pp. 40-41).

Hall and Soskice (2000, p. 42-43) provide empirical support for their hypothesis with patent data from the European Patent Office measuring patterns of technological specialisation for the US and Germany. The hypothesis, however, has not stood up very well to more general empirical tests based on larger populations of nations and using patent citations in the NBER patent database to measure the relative specialisation of nations in radical and incremental innovations (Taylor, 2004; Akkermanns et al. 2009). This needn't imply, as some authors appear to have argued (Herrmann, 2008; Lange, 2009), that national institutions no longer matter much for corporate strategy in an increasingly global economy. It may simply reflect the fact that the conception of institutional complementarities in the VoC literature which built explicitly on Aoki's classic comparative analysis of the Japanese and American firm in the 1980s and 1990s is outdated. For example, relatively fluid labour markets by promoting greater variety in knowledge and skills may well increase the likelihood that firms are well placed to introduce radical innovations. However, as the literature on flexicurity has argued, such labour market arrangements may be complementary to vocational training systems favouring investments in industry-specific skills associated with the generous provision of unemployment protection and consensus decision-making at the firm-level. Another case in point is the progressive deregulation of financial markets during the 2000s in a context of considerable national diversity in the strength and characteristics of national labour markets and systems of social protection. These 'hybrid' arrangements fit poorly into models proposing a dichotomous distinction, be it between the A-firm and the J-firm, or between liberal market economies (LME) and coordinated market economies (CME).

The identification of intuitional complementarities and the assessment of their performance impacts can provide a basis for developing robust taxonomies of national innovations systems and I would argue that making further progress in this area is one of the key challenges facing research on national systems within the field of innovation studies. A possible way forward is to start from a cognitive perspective and to examine how institutional complementarities promote the forms of related variety in organisational knowledge that sustain learning and innovation. For example, the cognitive perspective takes into account that highly creative firms draw their capability from the diverse and partially tacit industry-specific know-how and problem-solving skills that are embodied in individual experts. While codified formal professional knowledge will play a role, the expert's problem-solving capabilities may have more to do with his or her diverse experience acquired through interaction, trial-and-error and experimentation in a variety of company settings (Lam and Lundvall, 2006). Flexicurity systems might promote the accumulation and inter-organisational transfer of these capabilities in part because the security they provide through income maintenance can encourage individuals to commit themselves to what would otherwise be perceived as unacceptably risky forms of employment and career paths.[8]

4. Regions and nations: the need for a multi-level governance framework

The early work on regional innovation systems (Asheim, 1996; Cooke, 1992; Cooke et al. 1998) drew inspiration from seminal contributions to the research on national innovation systems, in particular work by Freeman (1987) and Lundvall (1992). A central idea was that of two subsystems engaged in processes of interactive learning, one composed of private enterprises, often tightly clustered, and the other composed of the regional supportive infrastructure, composed of a variety of organisations responsible for processes of knowledge generation and transmission, including public research institutions, universities, and vocational training providers.

A central issue addressed in this literature has been the relation between geographic distance and knowledge transmission. One strand of literature has focused on the role of formal knowledge spillovers in the performance of high technology sectors. It has provided evidence that the R&D activities of private-sector enterprises benefit from their location in regions that are well endowed with university research or other public sector research institutions.

[8] For an econometric analysis identifying positive links between flexicurity systems and high levels of employee learning for the EU-27, see Holm et al. (2010).

Proximity favours the transfer scientific and technical knowledge both though the recruitment of university-trained scientists and through formal R&D collaboration (Jaffe, 1989; Acs, et al. 1999; Link and Rees, 1990).

Another strand of research has emphasised the way proximity contributes to inter-firm transfer of tacit and industry-specific knowledge among regionally clustered firms (Lorenz and Lawson, 1999; Maskell, 1998; Storper, 1995). Unlike most of the research on national systems, there has been a clear emphasis in the regional systems literature on the role of labour markets in the transfer and exchange of knowledge among firms. The work of scholars like Saxenian (1996) on Silicon Valley is illustrative of this, and more recently an econometric literature has developed that seeks to test propositions concerning the importance of related variety in knowledge for innovation by drawing on linked data sets in order to estimate of the impact of labour market mobility on the firm's skill profile and performance (Boschma, 2009).

To my knowledge, however, little attention has been given in the regional innovation systems literature to the way differences in welfare state institutions might impact on local patterns of labour market mobility and knowledge accumulation. The reason for this presumably is that these framework conditions are nationally set and scholars working on regional systems have their eyes firmly focused on the specificities of the local level with a view to explaining differences across regions. From the statistical point a view an obvious question that has not been addressed is what part of observed differences in the characteristics and performance of firms can be accounted for by difference across nations and what part can be explained by differences across regions within nations? But the more general challenge is developing a multi-level governance framework that could address the neglected issue of the interrelations between national and regional systems of innovation.

In the European context the EU constitutes a third level of governance with largely unexplored impacts on the interrelations between regional and national innovation systems. While there is a large empirical literature analysing the growth effects of EU structural funds, the issue goes beyond the question of whether EU policies have promoted regional convergence.[9] One relevant question is whether institution building at the EU level has resulted in the creation of a European system of innovation that can be analysed on its own terms. While recent research on the issue has argued it is premature to identify a European

[9] For a recent review of the literature, see Mohl and Hagen (2010).

innovation system that can be analysed on the same terms as national or regional systems,[10] this does not preclude that the emergence of a supranational level of governance and regulation has had significant impacts on the relations between national and local systems. Especially in national contexts where there are existing intra-national-pressures for the decentralisation of policy making, the emergence of the European level of regulation may create new arenas for negotiation between actors and organisations at the regional and national levels, resulting in greater independence of the regional innovation system. While there is a lively literature on the characteristics of multi-level governance in Europe, the implications for innovation policy and outcomes at the regional and national levels remain to be fully explored.[11]

5. Policies for organisational change and innovation

There have always been close connections between innovation studies scholars and the policy community and it can be argued that the importance attached to research on particular concepts has been affected by the extent to which policy makers have picked-up on and adopted the concepts in their policy discourse. Research on innovation systems has no doubt been bolstered by the importance attached to the innovation systems concept in the policy documents coming out of the OECD, and it can even be disputed whether the origins of the concept is mainly the policy community or academic researchers (Sharif, 2006). The emphasis placed on the knowledge-based economy in the European Commission's 2000 Lisbon strategy has no doubt not only provided finance through the framework programs but has also conferred greater legitimacy on research focussing on the dynamics of knowledge accumulation and innovation.

There has also been a clear connection between the commitment of resources to the production of new survey data that may be used for research purposes and the policy importance attached to the concepts that the surveys are designed to measure. In the EU context, the considerable investments that have been made in expanding the geographical scope of existing surveys, or in conducting new surveys, during the 2000s is linked to the use of the 'open-method of coordination' which requires harmonised statistical measures at the EU level for purposes of setting targets and monitoring progress in achieving different policy

[10] See the collection of essays edited by Borrás (2004) in the special issue of *Science and Public Policy* on a European system of innovation.

[11] For the effects of multi-level governance on science policy in France, see: Crespy, Heraud and Perry (2007). For the case of innovation policies in Sweden, Switerland and the Netherlands, see Prange (2008)

goals. The CIS's evolution from a survey carried out on a voluntary basis by a handful of nations in the 1990s to a mandatory 2-year exercise for EU member nations at present can be explained in large measure by the importance attached by the European Commission to monitoring innovation performance in accordance with the goals of the Lisbon strategy.

I argued above that our understanding of innovation processes within national systems could benefit from better, harmonised enterprise-level survey data on organisational design and managerial practice. In lieu of the historically close connections between policy frameworks and priorities on the one hand, and the development of survey instruments on the other, it is useful to speculate on how favourable high-level policy discourse is at present to the commitment of resources to developing a harmonised EU-level organisational survey. The European Commission through Eurostat and the OECD traditionally have worked closely together on the design and development of innovation related survey instruments, and while the OECD has no formal responsibility for the direction of EU innovation policy it is nonetheless useful to consider how each institution has articulated innovation-related policy objectives and measures.

While promoting innovation remains a cornerstone of the European Commission's post-Lisbon, Europe 2020 strategy, the Commission' understanding of innovation and its approach to innovation policy appear to be remarkably narrow, focusing primarily on R&D and investments in the third-level educational qualifications of researchers. Europe 2020 sets out as one of its five headline targets that 3% of the EU's GDP should be invested in R&D (European Commission, 2010a, p; 5) and the Innovation Union, one of the Commission's flagship initiatives, though containing a large number 'action points' is to a large extent structured around the 3% objective. For example, the role of education and skills development is analyzed in terms of member countries "training enough researchers to meet their national R&D targets" and the discussion on promoting international labor mobility and cooperation within the EU Research Area is expressed in terms of the "mobility of researchers across countries and sectors" and the "cross-border operation of research performing organizations". Similarly, the importance of improving access to finance including venture capital is analyzed mainly in terms of closing "the market gaps in investing in research and innovation" (European Commission, 2010b, pp. 9 and 14).[12] The 2011 Innovation Competitiveness report focuses almost exclusively the 3% R&D target and the contribution of educational

[12] For the 30 action points of the Innovation Union, see: http://ec.europa.eu/research/innovation-union/index_en.cfm?pg=action-points.

investments and proposed reforms of the finance and patenting systems to achieving the target (European Commission 2011a). While a 2011 report on progress in attaining the overall objectives of Europe 2020 recognizes that existing differences in industrial structure between EU member states may account for the relatively low levels of R&D intensity in certain member nations, this is interpreted strictly as a weakness with little appreciation that firms operating in low-R&D intensive sectors may be highly innovative, or that many innovative firms, including a large share of service sector firms, do not spend on R&D (European Commission, 2011b, p. 5)

The EU 2020 strategy with its strong emphasis R&D intensity stands in sharp contrast to the OECD's 2010 Innovation Strategy, which develops a broad understanding of innovation processes that is much in keeping with recent trends in innovation research. The assessment of innovation policy measures in the Ministerial Report on the OECD's Innovation Strategy begins by observing that while R&D is important many highly innovative firms do not engage in R&D and that value may be created "through a wide range of complementary technological and non-technological changes and innovations" (OECD, 2010a, p. 6). The analysis of skills gives recognition to formal initial educational systems but also argues that skills acquisition is a lifelong process that extends beyond formal education and includes informal learning processes on the job. In this latter respect the report argues that, "organisational structures and employment policies that shape the workplace are essential for determining how human capital translates into innovation and productivity" (OECD, 2010a, p. 11).

In close association with the main elements of the Innovation Strategy, the OECD sets out an ambitious Measurement Agenda for Innovation. The measurement agenda report (OECD 2010b, p; 13) begins by observing that innovation is the result of a range of complementary assets that include not just R&D but also software, human capital and new organisational structures. The agenda report continues by pointing to the limitations of policies built around targeting spending levels on R&D and argues that there is a pressing need to go beyond targets and to develop an understanding of why and how innovation happens in firms. This can be furthered by making improvements to existing data infrastructures and notably by improving business registers and by increasing the scope for linking different data sets including linking innovation surveys with ICT surveys and with administrative data bases measuring firm-level expenditures on capital, earnings, and employment (OECD, 2010b, p. 14). The agenda report also recognises the need for new survey data and include a number of 'gap' pages that refer to key areas where there is a lack of high-quality internationally

comparable indicators. These include the "measurement of innovative activity in complex business structures, organisations and networks' and the "measurement of the skills required in innovative workplaces". The approach to skills development is sophisticated and goes beyond the traditional emphasis on the supply and demand for third-level educational qualifications that figures prominently in the European Commission's Innovation Union policy documents. The 'gap' page on 'Innovative workplaces and skills for innovation' in the measurement report notably argues that, "interaction and learning within firms enables employees to share information, challenge existing patterns, and experiment and collaborate to improve products and processes." Further, it observes that while "the potential role of learning and interaction within organizations has been highlighted as a way to strengthen firm performance in the post-crisis environment" that these "concepts remain difficult to quantify and better measurement instruments are needed" (OECD 2010b, p. 56).

The OECD's Measurement Agenda for Innovation sets out an ambitious programme both in terms of improving and making better use of existing data structures, and in terms of the development of new measurement instruments. The OECD report clearly recognizes that the agenda implies a long time frame and that it depends on the efforts and engagement not only of the statistical community and of policy makers but also of organisations and businesses since the statistical system can only collect what is feasible to measure inside organisations. While the necessary efforts and commitments for developing new measurement instruments organisational change and employee learning may be present in certain EU member nations, the largely traditional and conservative focus of the EU's Innovation Union clearly suggests that they do not exist at present at the EU level. A possible reason for the lack of support and engagement in this sense amongst policy-makers is the widespread perception that polices for organisational change and innovation would constitute an unacceptable infringement on managerial prerogatives. Despite its many forward thinking elements, this would also appear to be the dominant view within the OECD. The Ministerial Report on the Innovation Strategy, after arguing for the importance of interaction and learning within organisations, hastens to add, "governments do not play a direct role in the workplace" and the report limits the role of government policy to shaping the framework conditions that support learning and innovation at the workplace (OECD, 2010a, p. 11).

While my discussion in this paper has focused in part on the importance of institutional framework conditions for learning and innovation, recognition that institutions matter does not preclude more focused micro-policy initiatives. The Nordic nations have a long and rich

experience of policy programs designed to foster organisational change and innovation at the workplace level. These programs typically operate by providing competitive funding for the implementation of change within individual firms or within networks of organizations, with management and staff actively working alongside outside researchers or experts.[13] Examples include the Value Creation (VC) program in Norway, the TEKES program in Finland, and the workplace innovation programs administered though VINNOVA in Sweden. The approach adopted in these programmes overrides the objection that policies for organisational change constitute an unacceptable infringement on managerial prerogatives. A central feature of the policy approach is that workplace innovation projects are carried out at the initiative of the employer, who seeks competitive funding. Another important aspect of the policy approach is that projects for organisational change and innovation are based on implementation strategies adapted to the local conditions of the plant, which avoids the problem of proposing universal best-practice solutions which may be poorly adapted to the local technological or organisation context. These policy initiatives at the level of the workplace or networks of firms are highly complementary to the emphasis in the Nordic nations on developing broad-based vocational training and life-long learning systems in support of competency building. The complementary nature of these workplace policies and national framework initiatives may well provide part of the explanation for the advances made in the Nordic nations in extending and deepening learning at the workplace.

References

Acs et al. 1999

Akkermanns, D., C. Castaldi, and B. Los, (2009), "Do 'liberal market economies' really innovate more radically than 'coordinated market economies'? Hall and Soskice reconsidered", *Research Policy*, 38, pp. 181-91.

Alasoini, T., E. Ramstad, T. Hanhike, and M. Lahtonen, (2005), "European Programmes on Work and Innovation: a benchmarking approach", Work-in-Net Project, Supported by the 6th Framework Programme of the European Commission.

Anselin, L., A. Varga and Z. Acs, (1997) 'Local Geographic Spillovers between University Research and High Technology Innovations', Journal of Urban Economics, 42 (3) pp. 422-48.

[13] See Alasoini, et al. (2005) for an overview.

Aoki, M. (1986) Horizontal vs. Vertical Information Structure of the Firm, *The American Economic Review*, 76 (5), pp. 971-983

Archibugi, D. and B-A. Lundvall, 2001. *The Globalizing Learning Economy*, Oxford, Oxford University Press.

Armbruster, H., B. Andrea, K. Steffen and L. Gunter (2008). Organizational innovation: The challenge of measuring non-technical innovation in large-scale surveys. *Technovation*, 28, No. 10, pp. 644-657.

Arundel, A., Lorenz, E, Lundvall, B.-Å. and Valeyre, A. 2007, "How Europe's economies learn: a comparison of work organisation and innovation mode for the EU-15", *Industrial and Corporate Change*, vol. 16, no. 6, pp. 1175-1210.

Asheim 1996

Borrás, S. (2004). "Systems of Innovation Theory and the European Union", *Science and Public Policy*, 31 (6), pp. 425-33.

Boschma, R., R. Eriksson and U. Lindgren, 2009. "How does labour mobility affect the performance of plants? The importance of relatedness and geographical proximity", *Journal of Economic Geography*, **9**(2), 169–190.

Cohen,M. and D. Levinthal, 1989. "Innovation and learning: the two faces of R&D", *The Economic Journal*, 99, (397), pp. 569-96.

Cohen, M. and D. Levinthal, 1990. Absorptive capacity: a new perspective on learning and innovation", *Administrative Science Quarterly*, 35 (1).

Cooke 1992

Cooke et al. 1998

Crespy, C., J-A. Heraud and B. Perry (2007). "Multi-level Governance, Regions and Science in France: Between Competition and Equality", *Regional Studies*, 41 (8), pp. 1069-84.

Estevez-Abe, M. T. Iversen, and D. Soskice (2000) "Social Protection and the Formation of Skills: a reinterpretation of the welfare state", in Hall, P. and D. Soskice, 2001, *Varieties of Capitalism*, Oxford, Oxford University Press.

European Commission (2010a) "Communication from the Commission, Europe 2020, A strategy for smart, sustainable and inclusive growth", COM(2010) 2020 final, Brussels.

European Commission (2010b) **"**Europe 2020 Flagship Initiative Innovation Union", COM(2010) 546 final, Brussels.

European Commission, (2011a). "Innovation Union Competitiveness Report 2011, Executive Summary", Brussels.

European Commission (2011b) "Annex, Progress Report on the Europe 2020 Strategy: Annual Growth Survey 2012", COM(2011) 815 final, Brussels.

Fagerberg, J. and B. Verspagen, 2009. "Innovation studies—The emerging structure of a new scientific field", *Research Policy*, 38, pp. 218–233

Foss, N. and K. Laursen, (2003) "New human resource management practices, complementarities and the impact on innovation performance", *Cambridge Journal of Economics*, 27 (2), pp. 243-63.

Freeman, C. (1987) *Technology, policy, and economic performance: Lessons from Japan*, Printer Publishers, London.

Freeman and Soete

Freeman, C. 1995. "The 'National System of Innovation' in historical perspective", *Cambridge Journal of Economics*, 19, pp. 5-24

Freeman, C. and L. Soete (1987). *Technical Change and Full Employment*, Blackwell Publishers, London.

Hall, P. and D. Soskice, 2001, *Varieties of Capitalism*, Oxford, Oxford University Press.

Herrmann, A. M., 2008, "Rethinking the link between labour market flexibility and corporate competitiveness: a critique of the institutionalist literature", *Socio-Economic Revie*w, 6, pp. 637-669.

Hollingsworth, J. and R. Boyer (1997). *Contemporary Capitalism: the emnbeddedness of institutions*, Cambridge, Cambridge University Press.

Holm, J, E. Lorenz, B.A. Lundvall, A. Valeyre, (2010) "Work Organisation and Systems of Labour Market Regulation in Europe", *Industrial and Corporate Change*, 19 (4), pp; 1141-73.

Iversen, T. and D. Soskice (2001) "An Asset Theory of Social Policy Preferences", *American Political Science Review*, 9 (4), pp. 875-94

Jensen, M., B. Johnson, E. Lorenz and B-A. Lundvall. (2007) "Forms of knowledge and modes of innovation", *Research Policy*, 36, pp. 680-693.

Jaffe, A.B. (1989) "Real Effects of Academic research", *The American Economic Review*, 79 (5), pp. 957-70.

Lam and Lundvall

Lange, K., 2009, Institutional enbeddedness and the strategic leeway of actors: the case of the German therapeutical biotech industry', *Socio-Economic Review*, 7 (2) pp. 181-208.

Link, A. and J. Rees (1990) "Firm Size, University Based Research and the Returns to R&D", *Small Business Economics*, 2 (1) pp. 25-31.

Lorenz, E. and C. Lawson, (1999) "Collective Learning, Tacit Knowledge and Regional Innovative Capacity" *Regional Studies*, 33 (4), pp. 305-17

Lorenz, E., J. Michie and F. Wilkinson (2004). "HRM Complementarities and Innovative Performance in French and British Industry", in Christensen, J.L. and B.Å. Lundvall, (eds.), *Product Innovation, Interactive Learning and Economic Performance*, Elsevier.

Lorenz, E. and B-A. Lundvall, 2006. *How do Europe's Economies Learn: coordinating competing models*, Oxford, Oxford University Press.

Lorenz, E. and A. Valeyre, 2005. "Organisational Innovation, HRM and Labour Market Structure: A comparison of the EU-15", *Journal of Industrial Relations*, pp. 424-442.

Lorenz, E. and B-A. Lundvall, and A. Valeyre (2004) "The Diffusion of New Forms of Work Organisation and Worker Outcomes: Lessons from the European Case", Paper prepared for the 2nd Globelics International Conference: *"Innovation Systems and Development: Emerging Opportunities and Challenges"*, Beijing, China, October 16-20.

Lorenz, E. and B-A. Lundvall (2010). "Accounting for Creativity in the European Union: A multi-level analysis of individual competence, labour market structure, and systems of education and training" *Cambridge Journal of Economics*, 2010

Lundvall, B.-Å. (1985), *Product Innovation and User-Producer Interaction*, Aalborg, Aalborg University Press.

Lundvall, B-A. (1988). "Innovation as an interactive process: from user–producer interaction to the national system of innovation", in Dosi, G. Freeman, C., Nelson, R., Silverberg, G., Soete, L. (eds), *Technical Change and Economic Theory*. Pinter, London, pp. 349–369.

Lundvall and Johnson

Lundvall , B-A, (2002) *Innovation Growth and Social Cohesion: the Danish Model*, Edward Elgar.

Lundvall, B-A. and P. Nielsen (2007) "Knowledge Management and Innovation Performance", *International Journal of Manpower*, 28 (3/4), pp. 207-33.

Lundvall, B.-Å, Rasmussen, P. and Lorenz, E. (2008), 'Education in the Learning Economy: a European perspective', *Policy Futures in Education*, Volume 6 Number 2.

Maskell, P. (1998) *Competitiveness, Localised Learning and Regional Development: Specialization and prosperity in small open economies*, Routledge, London.

Miles, I. (2008) "Patterns of innovation in service industries", *IBM Systems Journal*, pp. 115-28.

Mohl, P. and T. Hagen (2010). "Do EU structural funds promote regional growth? New evidence from various panel data approaches", *Regional Science and Urban Economics*, 40 (5), pp. 353-65.

Nelson, R. 1993, *National Innovation Systems*: a comparative analysis', Oxford, Oxford University Press.

Nielsen, P. and B-A. Lundvall, (1999) "Competition and Transformation in the Learning Economy – Illustrated by the Danish Case", *Revue d'Economie Industrielle*, 88, pp. 67-89.

Prange, H. (2008). Explaining Varieties of Regional Innovation Policies in Europe, *European Urban and Regional Studies*, 15 (1), pp. 39-52.

OECD (2010a) *Ministerial Report on the OECD Innovation Strategy, Key Findings*, OECD Publishing. http://www.oecd.org/dataoecd/51/28/45326349.pdf

OECD (2010b) *Measuring Innovation: A New Perspective*, OECD Publishing.

Oslo Manual

Saxenian, A (1996) *Beyond Boundaries: Open Labor Markets and Learning in Silicon Valley.* Oxford: Oxford University Press

Schmidt, T. and C. Rammer, (2007) "The determinants and effects of technological and non-technological innovations – Evidence from the German CIS IV", Centre for European Economic Research (ZEW), Mannheim.

Sharif, N. (2006). "Emergence and Development of the National Innovations System concept", *Research Policy*, 35 (5), pp. 745-66.

Storper, M. (1995) The Resurgence of Regional Economies, Ten Years Later The Region as a Nexus of Untraded Interdependencies

Taylor, M. 2004, 'Empirical evidence against Varieties of Capitalism's theory of technological innovation'; *International Organization*, 58, pp. 601-31.

Tether, B. (2003) "The sources and aims of innovation in services: Variety between and within sectors", *Economics of Innovation and New Technology*, 12 (6), pp. 481-505.

Tidd, J. (2003). *Service Innovation: Organisational responses to technological opportunities and market imperatives*, Imperial College Press, London

Whitley, R. (1998). "Internationalization and varieties of capitalism: the limited effects of cross-national coordination of economic activities on the nature of business systems", *Review of International Political Economy*, Vol. 5, Issue 3, pp. 445-81.